

**Amendment and Response**

Applicant: Vladimir Abramov

Serial No.: 10/667,561

Filed: September 22, 2003

Docket No.: 05004

Title: UNIVERSAL MULTIFARIOUS GEARBOX OF MUTUALLY DEFINITE UNITS AND METHOD  
THEREFORE

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**IN THE CLAIMS**

Please amend claims 3, 22, 24, 26, 27, and add claims 28-38 as follows:

1-2. (Cancelled)

3.( Currently Amended)      A gearbox, comprising,

    a plurality of gears forming gearsets, each gearset including at least one shaft extending from the gearset, wherein the gearsets are sized having ratios varying by degrees of separation of a common ratio in a geometric sequence of torques,

    wherein, the degrees of separation of the common ratio for each pair of shafts is calculated by dividing a total number of gearset combinations of forward speeds in the gearbox by a number of gearsets between a first pair shafts, where the number of gearsets between two shafts is two or more, and then dividing the common ratio from the first pair of shafts by a number of gearsets between the next pair of shafts until all shaft pairs are calculated, and,

    the geometric sequence for each pair of shafts ~~includes~~allows a final gearbox ratio of 1.

4-21.(Cancelled)

22. (Currently Amended)      A gearbox comprising:

    a plurality of gears forming gearsets, each gearset including at least one shaft extending from the gearset, wherein the gearsets are sized having ratios varying by degrees of separation of a common ratio in a geometric sequence, wherein

    the gearbox includes no more than thirteen gearsets and the gearsets are configured to form the gearbox as comprising 24 forward torques;

    R is a common ratio in a geometric sequence, the gearbox further comprising:

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a first frame member that includes a first gearset unit having gearsets sized to have a common ratio selected from the group consisting of  $1/R^{12}R^{+2}$ ,  $1/R^8$  and  $1/R^6$ ;

a second frame member that includes a second gearset unit having gearsets sized to have a common ratio selected from the group consisting of  $1/R^4$ ,  $1/R^2$  and  $1/R^3$ ;

a third frame member that includes a third gearset unit having gearsets sized to have a common ratio of  $1/R$ ; and

a fourth frame member that includes a reverse pinion idle gear and a reverse gear coupled to a ~~power~~ powered source producing 24-12 reverse torques.

23 (Previously Presented) A gearbox comprising:

a plurality of gears forming gearsets, each gearset including at least one shaft extending from the gearset, wherein the gearsets are sized having ratios varying by degrees of separation of a common ratio in a geometric sequence, wherein the gearbox includes no more than thirteen gearsets and the gearsets are configured to form the gearbox as comprising 24 forward torques;

wherein R is a common ratio in a geometric sequence, the gearbox further comprising:

a frame member comprising 3 units of gearsets including:

a first unit having gearsets sized to have a common ratio selected from the group consisting of  $1/R^{12}$  and  $1/R^4$ ;

a second unit having gearsets sized to have a common ratio selected from the group consisting of  $1/R^6$  and  $1/R^2$ ; and

a third unit having gearsets sized to have a common ratio of  $1/R$ , and a reverse pinion coupled to a power source to produce 12 reverse torques.

24 (Currently Amended) A gearbox comprising:

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a plurality of gears forming gearsets, each gearset including at least one shaft extending from the gearset, wherein the gearsets are sized having ratios varying by degrees of separation of a common ratio in a geometric sequence, wherein  $R$  is a common ratio in a geometric sequence, the gearbox further comprising:

a frame member includes 4 units of gearsets ~~forming and~~ 5 shafts including:

a first unit having gearsets sized to have a common ratio selected from the group consisting of  $R^0$ ,  $1/R^8$  and  $1/R^3$ ;

a second unit having gearsets sized to have a common ratio selected from the group consisting of  $R^0$ ,  $1/R^8$  and  $1/R^3$ ;

a third unit having gearsets sized to have a common ratio selected from the group consisting of  $1/R^8$ ,  $R^0$ , and  $1/R$ ; and

a fourth unit having gearsets sized to have a common ratio of  $R^0$  and  $1/R$ , and a reverse pinion coupled to a power source to produce 24 reverse torques.

25. (Cancelled)

26. (Currently Amended) A gearbox comprising:

a plurality of gears forming gearsets, each gearset including at least one shaft extending from the gearset, wherein the gearsets are sized having ratios varying by degrees of separation of a common ratio in a geometric sequence, wherein  $R$  is a common ratio in a geometric sequence, the gearbox further comprising:

a frame member comprising 4 units of gearsets ~~forming and~~ 5 shafts, including a first input shaft and a second split input shaft such that the gearbox produces an additional 12 forward torques; and

a first unit having a gearsets sized to have a common ratio of  $R^0$ ;

a second unit having 2 gearsets sized to have a common ratio of  $1/R^{12}$ ;

a third unit of gearsets having gearsets sized to have a common ratio selected from the group consisting of  $1/R^4$  and  $1/R^3$ ; and

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a fourth unit of gearsets having gearsets sized to have a common ratio of  $1/R$ , and a reverse pinion coupled to a ~~power~~powered source to produce 24 reverse speeds.

27. (New~~Currently Amended~~) A method of gearbox design comprising:

selecting a number of torques for the gearbox;

determining a number of gearset units based upon a multiplier number representative of the number of torques selected;

providing a number of gearsets in each gearset unit based upon the number of torques selected;

determining a number of shafts equal to the number of gearset units plus one;

determining a degree of separation of a common ratio in a geometric sequence for each ~~for each~~ gearset unit by dividing the number of torques selected by the number of gearsets in a first gearset unit, and then dividing a remainder of the degree of separation of the common ratio by the number of gearsets in a second gearset unit; and

repeating a division step for remaining units until the degree of separation of the common ratio equals one.

28.(New) A gearbox as in claim 3 wherein the geometric sequence of torques is  $1/R^n$ , where R is common ratio forming a geometric sequence of forward speeds,  $1/R$  is common ratio forming a geometric sequence of forward torques, and n is the degrees of separation of a common ratio.

29.(New) A gearbox as in claim 3 wherein,

the ~~degrees of separation in of the degree of difference of~~ the common ratio in the geometric sequence for all gearsets ~~ratios between an adjacent pair of shafts~~ is the same.

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30.(New) A gearbox as in claim 3 wherein,

a first join gear on a second shaft of the gearbox engages a pinion of a first gearset on a first shaft and a gearwheel of a second gearset on a third shaft such that the join gear is part of two gearsets of two adjacent gearset units.

31.(New) A gearbox as in claim 30 wherein,

a pair of adjacent join gears on a shaft employs an addendum modification ~~shift~~ to account for ~~the-a~~ difference ~~in gear teeth sizes of four gearsets installed on three adjacent in spacing between the shafts due to different gear sizes in the gearsets such that the all gear teeth all are configured to mesh properly.~~

32.(New) A gearbox as in claim 3 wherein,

a reverse pinion engages one gearset on an adjacent pair of shafts for providing one or more reverse speeds.

33.(New) A gearbox as in claim 3 wherein,

a differential is affixed to at least one shaft of an adjacent pair of shafts.

34.(New) A gearbox as in claim 1 wherein,

The gearbox has at least one frame member.

35.(New) A gearbox as in claim 34 wherein,

the gearbox has more than one frame member.

36.(New) A gearbox as in claim 3 wherein,

at least one shaft of an adjacent pair of shafts has at least one outward end extending from the gearbox for connecting to other objects.

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37.(New) A gearbox as in claim 36 wherein,

the at least one shaft of the adjacent pairs of shafts has two outward ends and a gear disposed on each of the respective outward ends configured to connect to a powered source and able to be turned over to permit use of a previously unused side of teeth.

38.(New) A gearbox as in claim 3 wherein,

the gearbox has at least one split shaft and a clutch coupled to the split shafts.